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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/663,585	09/18/2000	Volker Stahl	PHD 99-124	4107

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EXAMINER	
STORM, DONALD L	

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 08/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/663,585	STAHL ET AL.	
	Examiner	Art Unit	
	Donald L. Storm	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-6_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-6_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Informalities

2. The Examiner notes, without objection, that the preamble in claim 6 does not limit the claim, since none of the phrases in the preamble are necessary to define the invention, since the preamble is not essential to understanding of limitations or terms in claim body, and since deletion of preamble phrases would not change the structural definition or operation of the features in the body of the claim. The body of the claim fully and intrinsically sets forth a complete invention, including all of its limitations, and the preamble offers no distinct definition of any of those limitations. A preamble generally is not limiting when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention. To search and apply prior art, the Examiner has not accorded any patentable weight to the preamble statements of the claim.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 3-6 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled

in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

5. Nothing in the disclosure as originally filed supports the subject matter of claim 3 by providing a description of the subject matter of searching tree paths that have a small probability at the beginning of the search. .

The original disclosure does not clearly allow persons of ordinary skill in the art to recognize that the Applicant invented at that time what is now claimed. The disclosure [at pages 2 and 13] discusses what is searched based on a small probability at the beginning of search. The disclosure, as filed, only discusses not searching paths that meet that criterion.

Although the written description requirement can be satisfied either by "express" or "inherent" disclosure, even inherent disclosure must make the Applicant's possession of claimed invention obvious. The written description requirement thus cannot be satisfied by remaining entirely silent on a claimed embodiment.

6. Claim 4 inherits the grounds of rejection of claim 3 by dependency.

7. Nothing in the disclosure as originally filed supports the subject matter of claim 5 by providing a description of the subject matter of restricting the recognition results of the letter speech recognition.

The original disclosure does not clearly allow persons of ordinary skill in the art to recognize that the Applicant invented at that time what is now claimed. The disclosure [at pages 2, 4, and 13] discusses restricting the vocabulary of the whole word recognizer, not restricting the

letter recognition. At page 9 of the specification as filed, the letter chain is explicitly described as not restricted by a vocabulary. The Examiner does not find a discussion of the claimed features and their relationships anywhere in the disclosure as filed.

Although the written description requirement can be satisfied either by "express" or "inherent" disclosure, even inherent disclosure must make the Applicant's possession of claimed invention obvious. The written description requirement thus cannot be satisfied by remaining entirely silent on a claimed embodiment.

8. Claim 6 is rejected in the same way as claim 1 because the limitations are recited using obviously similar phrases.

Claim Rejections - 35 USC § 103

Junqua and Fujisaki

9. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Junqua et al. [US Patent 5,799,065] in view of Fujisaki et al. [US Patent 5,392,363], both already of record.

10. Regarding claim 1, Junqua [see Fig. 5] and Fujisaki make a speech recognition embodiment recognizable as a whole to one versed in the art by explicitly describing the content and functionality of the recited limitations as the following terminology. In particular, Junqua describes:

a letter-sequence estimating (first) stage using a letter speech recognition unit based on HMM [at column 8, lines 55-66, as represent N-best possible spelled combinations of letters analyzing by HMM speech recognition as each letter is spoken];

a post-processing stage for the estimated letter sequence using a statistical letter sequence model for the speech recognition [at column 7, line 62-column 8, line 11, as a predefined letter grammar of pairs of letters and associated probability used in decoding the speech into letter hypotheses by the speech recognizer];

a post-processing (second) stage for the estimated letter sequence using a statistical model for the speech recognition [at column 10, line 57-column 11, line 12, as highly constrained alignment to evaluate the N-best hypotheses by DP alignment using HMM];

using dynamic programming during post-processing [at column 10, lines 60-63, as dynamic programming alignment compares the N-best hypotheses resulting from the recognizer];

dynamic programming is based on a grid with nodes [see Fig. 9, axes, hypotheses points, and their description, especially at column 12, lines 6-23, as the N-best hypotheses analysis here being the lattice technique that computes for each node];

the nodes are provided for assignment to probability values [at column 12, lines 7-10, where a computed likelihood is for each grammar node and the best (hypothesis) probabilities are stored];

the node's probability values have been accumulated [at column 9, lines 8-10, as paths are represented by probability matches from the beginning of the utterance];

the grid is converted into a tree [see Fig. 16, items n1, w1, na, etc. their connections, and their descriptions especially at column 12, lines 32-62, as prioritize the ending nodes as the vertical column, expand the node to the hypothesis that generated the node, in turn identify the node that generated the hypothesis, proceed in that manner until a starting node is identified];

use an algorithm for finding an optimum tree path [at column 12, line 36-column 13, line 2, as the backtracking algorithm sorts and substitutes higher scoring nodes such that the string

through the first nodes in the queue represents the hypothesis with the highest score when a starting node has been found].

However, Junqua does not explicitly describe the using the A* algorithm.

Fujisaki [see Fig. 27] describes an embodiment of recognition of letters of the alphabet using a tree structure corresponding to paths through a Viterbi lattice. Fujisaki also describes:

use an algorithm for finding an optimum tree path [at column 20, lines 22-61, as operate a search method to access a d-node of the vocabulary trie to determine probabilities and the maximum probability corresponding to the associated path];

use the A*algorithm [at column 17, lines 41-62, as the beam search technique is referred to as algorithm A*].

Fujisaki [at column 17, lines 34-43] points out the A* algorithm is a preferred beam search technique because of its efficiency. It would have been obvious to one of ordinary skill in the art of dynamic programming at the time of invention to include the A* algorithm with Junqua's DP search because Fujisaki shows its suitability in that role and that would bring the known A* search efficiencies to Junqua's beam search.

11. Regarding claim 2, Junqua also describes:

determining sub-optimum paths for the utterance corresponding to N best estimates with N>1 [at column 8, lines 17-50, as yield the N-best hypotheses that deviate from the best score no more that a beam width any N greater than 1];

the paths are tree paths [see Fig. 16, items n1, w1, na, etc. their connections, and their descriptions especially at column 12, lines 32-62, as the ending nodes are expanded to the

hypothesis that generated the node, in turn identify the node that generated the hypothesis, proceed in that manner until a starting node is identified].

12. Regarding claim 3, Junqua also describes:

during the search for an optimum tree path those tree paths that have a small probability are searched [at column 12, lines 44-60, as expanding the node in the backtracking step may substitute a node with a score for which other nodes have a higher score & at column 9, lines 8-10, as paths are represented by probability matches from the beginning of the utterance];

the small probability is at the beginning of the search [at column 12, lines 50-65, as node identification and sorting by score proceeds until a starting node is encountered].

Junqua and Fujisaki and Cecinati

13. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Junqua et al. [US Patent 5,799,065] in view of Fujisaki et al. [US Patent 5,392,363] and Cecinati et al. [US Patent 4,907,278] using the same rationale as in the prior Office action (paper 9).

Junqua and Fujisaki and Attwater

14. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Junqua et al. [US Patent 5,799,065] in view of Fujisaki et al. [US Patent 5,392,363] and Attwater et al. [US Patent 5,940,793], all already of record.

15. Claim 5 sets forth limitations similar to limitations set forth in claim 1. Junqua and Fujisaki describe and make obvious the limitations as indicated there. Junqua and Fujisaki

describe only letter speech recognition for spelled recognition of database words (names). Neither Junqua nor Fujisaki explicitly describes inputting and recognizing a whole word.

Attwater [at column 8, lines 10-25] describes an embodiment for spelled word recognition of database words (names). Like Junqua and Fujisaki, Attwater [at column 5, lines 24-55] uses a decoding tree structure and the Viterbi algorithm. In addition, Attwater describes:

inputting a whole word and recognizing the whole word that is input using word speech recognition [at column 6, lines 16-41, as the name of a town is received from a telephone call by the recogniser and the recogniser communicates the name of the town that most closely resembles the received reply (from the telephone call) with reference to the data stored in the name stores];

the whole word serves as a control signal [at column 8, lines 10-12 , as the word from earlier recognition generates a list of words to be recognized];

part of this word is input in spelled form and recognized [at column 8, lines 10-25, as receipt of letters of the spelled version of the name for a town name recognition]; and

restricting the recognition result of the letter speech recognition with a vocabulary assigned to the word speech recognition [at column 8, lines 40-43, as recognition of the requested spelling of a town name is checked against recognition results of town names].

Attwater [at column 5, lines 49-55] points out that restricting the active subset of the tree to be searched allows resources to be concentrated on the most likely words and should reduce erroneous recognition results. Following Attwater, it would have been obvious to one of ordinary skill in the art of speech recognition at the time of invention to include both word and letter inputs because the resources could be concentrated on the mostly spoken input and errors in recognition results would be lessened.

Attwater and Cecinati

16. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Attwater et al. [US Patent 5,940,793] in view of Cecinati et al. [US Patent 4,907,278], both already of record.

17. Regarding claim 6, Attwater [at title] and Cecinati make a speech-controlled embodiment recognizable as a whole to one versed in the art by explicitly describing the content and functionality of the limitations recited in the body of the claim as the following terminology.

In particular, Attwater describes:

receiving a whole word and recognizing the whole word using word speech recognition [at column 6, lines 16-41, as the name of a town is received from a telephone call by the recogniser and the recogniser communicates the name of the town that most closely resembles the received reply (from the telephone call) with reference to the data stored in the name stores];

the whole word serves as a control signal [at column 8, lines 10-12 , as the word from earlier recognition generates a list of words to be recognized];

receiving part of this word in spelled form and recognizing the spelled part [at column 8, lines 10-25, as receipt of letters of the spelled version of the name for a town name recognition];

the spelled part recognition uses letter speech recognition [at column 8, lines 10-18, as the list of words to be recognized may be names of letters of the alphabet]; and

restricting the recognition result of the letter speech recognition with a vocabulary assigned to the word speech recognition [at column 8, lines 40-43, as recognition of the requested spelling of a town name is checked against recognition results of town names].

Attwater describes the algorithm and an apparatus to provide the described functionality; however, Attwater does not explicitly describe executing code.

Cecinati [at column 9, lines 61-66] also describes HMM speech recognition using dynamic programming. Cecinati also describes:

first and second processing units [at column 1, lines 7-20, as a higher-level master integrated circuit and a lower-level slave integrated circuit];

the processing units are for executing code [at column 1, lines 7-10, as the ICs are microprogrammed for employment in speech recognition systems]. .

The many teachings of Attwater imply, but do not explicitly describe, processing units executing code for implementation of the algorithms. To the extent that a programmed processor is not necessarily part of Attwater's system, it would have been obvious to one of ordinary skill in the computer and electronic arts at the time of invention that Cecinati's concept of programmed ICs could be used with program segments in accordance with Attwater's teachings because programmed processor implementation would eliminate the tedium of manual calculation of repetitive operations.

Response to Arguments

18. The prior Office action, mailed March 26, 2004 (paper 9), objects to the claims, and rejects claims under *35 USC § 103* citing Junqua, Fujisaki, and others. The Applicant's arguments and changes in AMENDMENT and RESPONSE TO OFFICE ACTION, filed June 28, 2004, have been fully considered with the following results.

19. With respect to objection to the claim needing interpretation, the changes entered by amendment provide clear descriptions of the claimed subject matter. Accordingly, the objection is removed.

20. With respect to rejection of claims under *35 USC § 103*, citing Junqua and Fujisaki in combination and with others, the Applicant's arguments appear to be as follows:

a. The Applicant's argument appears to be that Junqua's lattice technique of speech recognition does not have all the letters of the utterance represented on the grid as shown in Fig. 2 of the disclosure. This argument is not persuasive because the features upon which the Applicant's argument relies are not recited in the rejected claims.

Nevertheless, Junqua [at column 8] uses the lattice to select the probable path of a sequence of letters (based on HMM probabilities). Junqua's lattice [at Fig. 9, and column 15, lines 6-23] is the grid structure, with an input speech axis, a reference model axis, nodes that track the propagated likelihoods, and the retained track for the best match].

Junqua's [at column 8, lines 58-60] use of only the preceding letter to select the start time of the next letter is merely a restatement of the use of the bigram letter grammar, which uses only pairs of letters to hypothesize which letter may follow a preceding letter.

b. The Applicant's argument appears to be that the structure shown in Junqua's Figure 16 is not a tree structure converted from the grid. This argument is not persuasive because each node is expanded to its left for backtracking via the several connections to several other nodes in sequence; Junqua shows no loopbacks. Also, Junqua describes the grid is converted into a tree [at column 12, lines 32-62] as the ending nodes of lattice propagation in the vertical column, and expanding the node to the left, repetitively, until the starting node of lattice propagation is reached.

c. The Applicant's argument appears to be that Junqua includes only one value at each node of the tree, not a plurality of values at each node of the tree as shown in Fig. 3 of the

disclosure. This argument is not persuasive because the features upon which the Applicant's argument relies are not recited in the rejected claims.

d. The Applicant's argument appears to be that the nodes of Junqua's lattice are not provided for assignment of accumulated probabilities. This argument is not persuasive because Junqua describes the computation and storage of probabilities for each node at least at column 12, lines 7-10, where a computed likelihood is for each grammar node and the best node probabilities are stored. The Examiner has reworked and expanded this part of the rejection of claim 1 to indicate more clearly how Junqua has the assignment of probabilities for nodes of the lattice.

e. The Applicant's argument appears to be that the Examiner has failed to show the teachings of Fujisaki that would motivate an artisan to A* with Junqua's lattice. This argument is not persuasive because the prior Office action points to Fujisaki's Fig. 27 and column 17 to show that Fujisaki uses A* in application to beam search through a lattice, which Junqua also performs. Fujisaki also points out that A* is the preferred way to do it.

The Applicant's arguments have been fully considered but they are not persuasive. Accordingly, the rejections are maintained.

Note that the Applicant (page 8 of Amendment and RESPONSE) has found Junqua's tree structure propagates the N-best hypotheses. This may be only a broad summary of Junqua since Junqua's tree [at Fig. 16] was constructed for backtracking the N-best hypotheses, which were retained from propagation through the lattice [at Figs. 9 and 15] due to (best) probability scoring at lattice nodes.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Any response to this action should be mailed to:

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23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald L. Storm, of Art Unit 2654, whose telephone number is (703) 305-3941. The examiner can normally be reached on weekdays between 8:00 AM and 4:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see http://pair-direct.uspto.gov.

Donald L. Storm
Donald L. Storm
August 11, 2004

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER